AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

What is claimed is:

1. (Currently amended) A method of distinguishing oil based drilling fluid from subterranean formation fluid hydrocarbons during nuclear magnetic resonance testing while drilling a borehole in the subterranean formation, said method comprising:

drilling a borehole in a subterranean formation using oil based drilling fluid;

during the drilling, adding paramagnetic species to the drilling fluid, wherein said paramagnetic species comprises Fe^{3+}, Mn^{2+}, Ni^{2+}, and Cu^{2+}, Gd^{3+}, tetramethylpiperdinenyl-1-oxyl ions or combinations thereof;

and circulating the drilling fluid containing the paramagnetic species in the borehole prior to said testing, wherein the testing comprises logging the borehole, taking nuclear magnetic resonance measurements of the subterranean formation during the logging, and identifying the shift in the NMR response or T2 inversion that distinguishes the drilling fluid from formation fluid hydrocarbons.

2.-7. Canceled.

8. (Currently amended) A method of detecting hydrocarbon-bearing zones in a formation penetrated by a borehole drilled with oil-based drilling fluid, said method comprising:

adding paramagnetic species to said drilling fluid prior to or during the drilling of said borehole, wherein said paramagnetic species comprises Fe^{3+}, Mn^{2+}, Ni^{2+}, and Cu^{2+}, Gd^{3+}, tetramethylpiperdinenyl-1-oxyl ions or combinations thereof;

circulating said fluid comprising the paramagnetic species in said borehole; and

following such circulation of said fluid, acquiring nuclear magnetic resonance

measurements of at least a portion of the formation through said borehole for analyzing the nuclear magnetic resonance spectra from said measurements in determining whether said portion of the formation contains a hydrocarbon bearing zone, by identifying the shift in the NMR response or T2 inversion that distinguishes the drilling fluid from formation fluid hydrocarbons.

9. (Previously presented) The method of claim 8 wherein said nuclear magnetic resonance measurements are taken during logging-while-drilling operations.

10. (Currently amended) The method of claim 8 further comprising taking at least one core sample from the region of said formation at which the nuclear magnetic resonance measurements were taken for analyzing said sample in determining whether said region of the formation contains a hydrocarbon bearing zone, using nuclear magnetic resonance and identifying the shift in the NMR response or T2 inversion that distinguishes the drilling fluid from formation fluid hydrocarbons.

11. (Currently amended) A method of detecting or identifying characteristics of hydrocarbons in the formation surrounding a borehole drilled with oil-based drilling fluid, said method comprising:

adding paramagnetic species to said drilling fluid prior to or during use of the drilling fluid in the drilling of said borehole, wherein said paramagnetic species comprises Fe^{3+}, Mn^{2+}, Ni^{2+}, and Cu^{2+}, Gd^{3+}, tetramethylpiperdinenyl-1-oxyl ions or combinations thereof;

circulating said fluid containing the paramagnetic species in said borehole while drilling the borehole; and

following such circulation of said fluid, acquiring nuclear magnetic resonance measurements of at least a portion of the formation surrounding the portion of the borehole penetrating the formation drilled using the drilling fluid containing the paramagnetic species, for

analyzing the nuclear magnetic resonance measurements to detect or identify characteristics of hydrocarbons in the formation, including identifying the shift in the NMR response or T2 inversion that distinguishes the drilling fluid from formation fluid hydrocarbons.

12. (Previously presented) The method of claim 11 wherein said nuclear magnetic resonance measurements are taken during logging-while-drilling operations.

13. (Currently amended) The method of claim 11 further comprising taking at least one core sample from the region of said formation at which the nuclear magnetic resonance measurements were taken for analyzing in detecting or identifying characteristics of hydrocarbons in the formation, including identifying the shift in the NMR response or T2 inversion that distinguishes the drilling fluid from formation fluid hydrocarbons.

14. (Currently amended) A process of analyzing the fluid composition of a subterranean formation near a borehole drilled with oil-based fluid, said process comprising adding oil soluble or oil solubilized paramagnetic species to said oil-based fluid prior to or during said drilling of the borehole and detecting any filtrate of said drilling fluid containing the paramagnetic species in said formation using nuclear magnetic resonance, wherein said paramagnetic species comprises Fe^{3+}, Mn^{2+}, Cu^{2+}, Gd^{3+}, tetramethylpiperdinenyl-1-oxyl ions, or combinations thereof, and the shift in the NMR response or T2 inversion that distinguishes the drilling fluid from formation fluid hydrocarbons is identified.

15.-16. Canceled.

17. (Original) The process of claim 14 wherein said analysis is conducted in the laboratory on cores of the formation sampled after said drilling with fluid to which said paramagnetic species were added.

18. (Original) The process of claim 14 wherein said analysis is conducted using measurements taken with a nuclear magnetic resonance tool in said borehole after said drilling with fluid to which said paramagnetic species were added.

19.-31. Canceled.

32. (Currently amended) A method of drilling a borehole in a subterranean formation, said method comprising: the step of providing an oil-based drilling fluid comprising paramagnetic species comprising transition metals, rare earth metals, persistent organic radicals, or combinations thereof, having paramagnetic character for use in drilling the borehole; and the step of drilling said borehole using said drilling fluid, wherein the paramagnetic species in said drilling fluid are oil soluble or oil solubilized and comprise Fe^{3+}, Mn^{2+}, Ni^{2+}, and Cu^{2+}, Gd^{3+}, tetramethylpiperdinenyl-1-oxyl ions or combinations thereof, and further comprising the step of logging the formation using a wireline nuclear magnetic resonance tool in said borehole and the step of using the logs from said logging to analyze the formation fluids, thereby identifying the shift in the NMR response or T2 inversion that distinguishes the drilling fluid from formation fluid hydrocarbons, and thus detecting hydrocarbon bearing zones in the subterranean formation.

33.-36. Canceled.

37. (Currently amended) A method of drilling a borehole in a subterranean formation, said method comprising: the step of providing an oil-based drilling fluid comprising paramagnetic species comprising transition metals, rare earth metals, persistent organic radicals, or combinations thereof, having paramagnetic character for use in drilling the borehole; and the step of drilling the borehole using the drilling fluid, wherein the paramagnetic species in the drilling fluid are oil soluble or oil solubilized, and further comprising the step of taking core samples from said formation and the step of testing the core samples using nuclear magnetic resonance to

analyze the formation fluids, thereby identifying the shift in the NMR response or T2 inversion that distinguishes the drilling fluid from formation fluid hydrocarbons, and thus detecting hydrocarbon bearing zones in the subterranean formation.

38-45. Canceled

46. (Previously presented) The method of claim 1 wherein the paramagnetic species is added to the drilling fluid before the borehole is drilled through the point of the formation to be tested.

47. (Previously presented) The method of claim 1 wherein the paramagnetic species is added to the drilling fluid at least about 200 feet before the point of the formation for testing is drilled.